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## DESKTOP STAND AND MOBILE PHONE

### BACKGROUND OF THE INVENTION

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#### Field Of The Invention

The present invention relates to the field of mobile phones and mobile phone accessories such as desktop stands. In particular it relates to mobile phones having FM radio and/or music player functionality.

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#### Description of the Prior Art

Desktop chargers such as the Nokia® DCH-9 desktop stand serve conventionally two functions, namely, as a desktop stand and as a charger. The Nokia® DCH-9 desktop stand has further additional features for charging a spare battery. A Nokia® ACP-7 charger comprising an AC/DC transformer is connected to the Nokia® DCH-9 desktop stand and supplies the required DC current via a cable to the desktop stand. The Nokia® EDC-20 Desktop Charger/Speakerphone (US-D-367651) is a desktop stand for a mobile phone having charging capacity and in build speakerphone. The Nokia® 8310 and 6510, are advanced mobile phones which have an in-built FM radio. The Nokia® 5510 mobile phone comprises an FM stereo radio and a digital music player and recorder. From US-D-366,873 and US-D-380,753 there are known bases for cordless phones with a clock radio integrated in the base. As a general trend in the mobile phone industry an integration of a variety of functions is considered desirable. In most cases, the integration of additional functionality requires though extensive modifications to the existing hardware.

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#### SUMMARY OF THE INVENTION

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On this background, the present invention provides a system comprising a desktop stand and a mobile phone of the kind referred to initially, with additional integrated functionality. The invention provides a system comprising a desktop stand and a mobile phone, the desktop stand comprising a loudspeaker and a connection which connects the loudspeaker to an audio signal from the mobile phone, the mobile phone comprising a radio receiver

and/or audio signal player for producing the audio signal, the mobile phone further comprising a connection for routing the audio signal to the loudspeaker and a timer or clock to activate the radio receiver and/or audio signal player. This system allows the mobile phone together with the desktop stand/charger

5 to be used as a clock radio.

Advantageously, the desktop stand is provided with a button for activating interruption or ending the audio signal, and preferably the audio signal is  
10 interrupted for only a predetermined time, thus giving the system a so-called "snooze" functionality. Preferably, the amplitude of the audio signal is after activation gradually increased until a predetermined level, to avoid a brisk start

of the audio signal.

The desktop stand may comprise a connector for conducting DC current to corresponding counterparts on the mobile phone for charging the battery of the mobile phone whilst it is placed on the desktop stand. Hereto, the desktop stand preferably may include a DC power source, in the form of an AC/DC converter and charging circuitry or has a connection to an external, preferably detachable, DC power source.

The desktop stand may comprise an amplifier, preferably associated with a volume button on the desktop stand, for amplifying the audio signal before routing it to the loudspeaker. In a preferred embodiment, the availability of a  
25 DC charging current allows the full screen size of a display on the mobile phone to be used to display the actual time when the mobile phone is placed on the desktop stand, with the screen back lights activated. The desktop stand may further comprise a microphone and a connection for routing a signal from the microphone to the mobile phone, so that the system may be used as a  
30 speakerphone. The desktop stand may further comprise a connector and the mobile phone a counterpart for transmitting the audio signal from the mobile phone to the desktop stand, or alternatively, the transmission of the audio signal could be by radio or infrared signal. The mobile phone may comprise a menu controlled programmable alarm clock, allowing selection of the desired  
35 audio signal source.

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The present invention further provides a use of a mobile phone having a radio receiver and/or audio signal player for producing an audio signal and having a programmable alarm clock for activating the radio receiver and/or audio signal player together with a desktop stand having a loudspeaker as a clock radio.

5       The present invention also provides a mobile phone of the kind referred to initially, with additional integrated functionality. A mobile phone is provided comprising a radio receiver and/or digital audio player for producing an audio signal, the mobile phone further comprising charging contacts arranged on an  
10      outer surface of the mobile phone for allowing contact with counterparts of a desktop stand or the like, the mobile phone further comprising contacts on the external surface of the mobile phone for allowing contact with counterparts arranged on the desktop stand or the like for routing the audio signal to the a desktop stand or the like.

The invention also provides a desktop stand of the kind referred to initially, with an additional integrated functionality. A desktop stand is provided comprising a loudspeaker and a cradle for receiving a mobile phone, the cradle being provided with charging contacts for allowing contact with counterparts of the mobile phone and the cradle being provided with contacts for allowing contact with counterparts of the mobile phone receiving an audio signal from the mobile phone and routing the signal to said loudspeaker.

25      Further objects, features, advantages and properties of the system and use according to the invention will become apparent from the detailed description.

#### BRIEF DESCRIPTION OF THE DRAWINGS

30      In the following detailed portion of the present description, the invention will be explained in more detail with reference to the exemplary embodiments shown in the drawings, in which:

Fig. I is a diagrammatic view of a desktop stand with a mobile phone placed on it,

35      Fig. 2a is a diagrammatic view from above of the desktop stand,

Fig. 2b is a diagrammatic detailed view from below on the desktop stand,  
Fig. 3a is a diagrammatic frontal view on the mobile phone,  
Fig. 3b is a diagrammatic view from below on the mobile phone, and  
Fig. 4 is a diagrammatic view of a charger.

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#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the following detailed description, the invention will be described by the preferred embodiments. With reference to the figures, the desktop stand 1 comprises a housing 1, having a flat base surface and four feet 5 for resting on a desktop surface (not shown) such as a writing desk or a night table. The desktop stand 1 has a connector recess 23 for charging a mobile phone 50, and respectively, a connector recess 24 for charging a spare battery (not shown) of the mobile phone 50. The combination of the desktop stand 1 and the mobile phone 50 will be referred to hereafter as "the system". The connector recess 23, which is meant for the mobile phone 50, has a charging current connector 25,25' for feeding electric power and a connector 26,26' for an audio signal transfer between the mobile phone 50 and the desktop stand 1. The mobile phone 50 has a counterpart 56,56' for receiving charging current and connectors 57,57' for transferring the audio signal. Thus, when the mobile phone 50 is connected to the desktop stand 1, both audio signals and electric power can be transferred between them. The desktop stand is at its bottom surface provided with a loudspeaker 40. The loudspeaker 40 may be arranged in any other surface of the desktop stand to suit design and acoustic requirements as they may be.

The desktop stand comprises in a preferred embodiment an amplifier (not shown), for amplifying the audio signal from the mobile phone before routing it to the loudspeaker 40. A volume up/down button 32 associated with the amplifier is also provided on the desktop stand 1.

The desktop stand 1 is further provided with a slumber button 31 that activates a circuit located either in the desktop stand 1 or in the mobile phone 50 that interrupts the audio signal for only a predetermined time, thus giving the

system a so-called "snooze" functionality. Further, a button 38 for terminating the audio signal is also provided on said desktop stand 1.

The desktop stand 1 is connected to an external charger 60, which converts 5 AC power to DC power (for example, 6.5 V and 2A) and supplies a charging voltage to the connector 25,25' of the desktop stand 1. The charger 50, such as a Nokia® ACP7 charger, is fully conventional, easily disconnectable from the desktop stand 1 through a connector on the charger cable (not shown) and a counterpart (not shown) on the desktop stand 1. The charger 60 can also be 10 used to charge the mobile phone 50 in the absence of the desktop stand 1 by plugging the connector on the charger cable in the connector 55 of the mobile phone 50.

The desktop stand 1 comprises a connector 25,25' for conducting the DC current to corresponding counterparts 56,56' on the mobile phone 50 for charging the battery of the mobile phone 50 whilst it is placed on the desktop stand 1. A second charging connector 37,37' is provided on the connector recess 24 and is supplied with DC current from the same source for charging a spare battery (not shown).

According to another embodiment (not shown) the desktop stand 1 includes a DC power source, in the form of an AC/DC converter and a connection for connection to the mains.

25 The desktop stand 1 is provided with microphone 12. As illustrated in Fig. 1, the microphone and an amplifier (not shown) may furnish audio signals to the mobile phone 50 during speakerphone operations through connectors 33,33' on the mobile phone 50 and connectors 77,77' in the cradle 24. However, the microphone 54 of the mobile phone 50 may be used instead if acoustic 30 conditions so require. Gain may be added to the transmission path to facilitate the use of either microphone 12,54. Audio signals during speakerphone operation from the mobile phone 50 may be furnished to the speaker amplifier in the desktop stand 1 and loudspeaker 40 in a similar manner. Speaker volume may be controlled from the desktop stand by adjusting the volume up/down button 32. In response, gain or loss will be added to the receive path. 35

The loudspeaker 54 of the mobile phone 50 is not active during speakerphone operation.

The mobile phone 50, as shown in more detail in Fig. 3, is provided at its front with an LCD display 52 and a keypad 51. Both the keypad 64 and the LCD display 52 are provided with a backlight to facilitate the use of the mobile phone 50 in low light conditions. The backlight switches off automatically shortly after the last use of the keypad 54 to reduce energy consumption, unless the mobile phone 50 is placed on the desktop stand 1 and receives DC power from a charger. Further, when the mobile phone 50 recognizes that it is placed on the desktop stand 1 and receives charging current, it will display the current time on the full screen size of the LCD display 52, with the screen back lights activated, so that it will serve as the equivalent to the digit-readings of a conventional clock radio.

The mobile phone 50, such as a GSM or 3G phones, is provided with an FM radio in the form of a tuner or a receiver. Alternatively, a radio tuner/receiver for a different radio frequency band such as AM may be used. In a preferred embodiment, the mobile phone 50 is provided with a digital music player, such as an MP3 or an AAC digital music player. Alternatively other types of music player may be used such as tape players or disc players etc. In another preferred embodiment, the mobile phone 50 is provided with both a FM radio receiver and a digital music player. The audio signal from any of the mentioned sources is routed to connector 57,57'. The mobile phone 50 is menu controlled through the keys on the keypad 51. The menu allows selection from a number of stored FM radio frequencies. The menu comprises a programmable alarm clock menu that allows selection of the desired alarm time, and selection of the desired source for the audio signal, e.g. the FM radio, the digital music player or one of a plurality of stored alarm signals. When the preset alarm time is reached, the mobile phone 50 activates the selected source for the audio signal.

Either the desktop stand 1 or the mobile phone 50 is provided with a circuit for gradually increasing the amplitude of the signal fed to the loudspeaker 40 after activation by the programmable alarm clock in the mobile phone 50, until a

predetermined level is reached to avoid a brisk start of the audio signal when e.g. waking up a sleeping person.

According to a preferred embodiment, the desktop stand 1 comprises  
5 connectors 26,26',33,33' and the mobile phone a counterparts 57,57',77,77'  
for transmitting audio signals from the mobile phone 50 to the desktop stand 1  
and vice versa. Alternatively, the transmission of the audio signals could be by  
radio signals such as in Blue Tooth Technology with the mobile phone 50  
equipped with a short range radio transmitter and the desktop stand equipped  
10 with a radio receiver, or by infrared signals, with the mobile phone 50  
equipped with an infrared transmitter and the desktop stand equipped with an  
infrared receiver.